STANDARD OPERATING PROCEDURE
Instructions for Setup of the MetOne® Meteorological Station

KEY WORDS

air sampling, weather station

APPROVALS

APPROVED BY:_____ DATE:_____
Kean S. Goh, Management

APPROVED BY:_____ DATE:_____
Mark Pepple, EHAP Senior Scientist

APPROVED BY:_____ DATE:_____
Carissa Ganapathy, EHAP Quality Assurance Officer

PREPARED BY:_____ DATE:_____
Pam Wofford, Associate Environmental Research Scientist

Environmental Hazards Assessment Program (EHAP) organization and personnel, such as management, senior scientist, quality assurance officer, project leader, etc., are defined and discussed in SOP ADMN002

STANDARD OPERATING PROCEDURE
Instructions for Setup of the MetOne® Meteorological Station

1.0 INTRODUCTION

1.1 Purpose

Monitoring air quality often requires the use of a meteorological station and datalogger to measure and record weather conditions during a monitoring study. Weather data is often an integral portion of analyzing results from a monitoring study.

1.2 Scope

This document will define the set up and use of the Met One® Meteorological Station and Campbell Scientific 21X Micrologger in the field.

2.0 MATERIALS

2.1 Support platform for station (trailer)
2.2 Crossarm assembly
2.2 Met One® 020C Wind Direction Sensor
2.3 Met One® 010C Wind Speed Sensor
2.4 Vaisala Temperature and Relative Humidity Sensors in Radiation Shield
2.5 Sensor cables
2.6 Campbell Scientific 21X Micrologger
2.7 2 Campbell Scientific SM192/716 storage modules and cables
2.8 External battery
2.9 Tape
2.10 Allen wrench set
2.11 Compass
2.12 Hand-held thermometer
2.13 Sling psychrometer
2.14 Anemometer

3.0 PROCEDURES

3.1 Set up of platform, tower and micrologger

3.1.1 Place trailer on a flat, level spot, free and clear of obstacles that will directly affect measurements, such as nearby buildings and trees. Make sure the trailer is away from overhead electric wires. Place a cement block solidly below trailer hitch and lower post. Block tires.

3.1.2 With at least two people, lift tower to upright position. Place locking pin through holes lined up at bottom of tower. Lower trailer hitch to lift back end of trailer and place triangular block under tower. Adjust trailer hitch post height to level horizontal length of trailer

3.1.3 Place micrologger in box on trailer. Run cables through notch at top of cabinet. Make sure micrologger is connected to the storage modules. Connect micrologger to battery with cables. If micrologger is not on, turn on the power switch. If the storage module is connected, the 21X will automatically download the operational program loaded in the storage module.

3.1.4 Crank up tower until top of extension pole is above top rail of tower. Mount the Crossarm Assembly horizontally to top of extension pole and tighten the two set screws. Remove from protective containers, one at a time, and mount on crossbar.

3.2 Wind Direction Sensor Installation

3.2.1 Mount the vane assembly onto the sensor housing by supporting the rotating hub with one hand while placing the vane onto the hub with the other hand. Tighten the bottom of the two screws on the vane hub. Do not overtighten. Then check to see that the vane assembly rotates freely.

3.2.2 Mount the sensor in the pipe fitting at the end of the crossarm assembly.

3.2.3 Orient the crossarm assembly in a magnetic north direction with a compass. The orientation notch on the sensor should be aligned with the crossarm assembly.

3.2.4 Tighten screws in the pipe fitting to secure with allen wrench. Do not over-tighten.

3.2.5 Connect the sensor cable to the bottom of the sensor and secure to mounting arm with tape.

3.2.6 Once the sensor is connected to the micrologger, check the sensor set up by orienting the sensor with the crossarm so that the counter weight is pointing north. The orientation notchs on the sensor should line up. Press *1 on the 21X keyboard and the **A** key until the readout for wind direction is presented. The readout on the micrologger should show a 0° for the sensor.

3.3 Wind Speed Sensor Installation

3.3.1 Carefully mount the cup assembly onto the transmitter shaft. Tighten the screws in the cup mount to secure. Do not over-tighten. Then check to see that the cup assembly rotates freely.

3.3.2 Install the sensor in the middle pipe fitting on the crossarm assembly. Tighten the screws in the pipe fitting to secure. Do not over-tighten.

3.3.3 Connect the sensor cable to the bottom of the sensor and secure to mounting arm with tape.

3.4 Relative Humidity/Air Temperature Sensors Installation

3.4.1 Check to see that the sensor rotates freely before installation.

3.4.2 Install the shield in the pipe fitting on the other end of the crossarm assembly. Tighten the screws in the pipe fitting to secure. Do not

overtighten.

3.4.3 Connect the sensor cable to the bottom of the sensor and secure to mounting arm with tape.

3.5 Check sensors reading on the 21X micrologger. Press *1 on keyboard to display program instructions. Press the **A** key to advance through the program. As you go through the sensor readings, check the readings to see if they are appropriate for the present weather conditions. If the readings are not appropriate, check the sensors to make sure they are working properly and are set up correctly.

3.6 Raise tower to full height. Secure cables to tower with tape.

4.0 Routine service checks

4.1 Daily checks

4.1.1 Review datalogger data for correct operation of the sensors.

4.1.2 Perform a visual inspection of the sensors to assure that the sensors have not been damaged and are operating properly.

4.1.3 Use a hand-held thermometer, sling-psychrometer and anemometer to check readings from the temperature and relative humidity, and wind speed sensor. Readings may be slightly off due to difference in height of measurement.

5.0 Calibration

The MetOne® meteorological station should be returned to the manufacturer periodically for calibration.

6.0 Troubleshooting

6.1 Before starting any troubleshooting procedure, refer to the sensor

operating manual for specific information pertaining to troubleshooting. Record malfunctions and repairs in study field notebook.

6.2 Troubleshooting should attempt to isolate the source of the malfunction and reduce maintenance time. The following should be checked if a problem exists:

6.2.1 Visually inspect sensor.
a. Checking for signs of damage.
b. Verify that the sensor assembly is turning freely.

6.2.2 Check for loss voltage supply.

6.2.3 Check for proper operation of the sensor bearings. Bad bearings may affect the starting threshold.

6.2.4 Verify that the cable connections are secure.

6.2.5 Verify proper micrologger initialization.

7.0 Disassembling the Meteorological Station

7.1 Lower extension pole to a level just above the railing on the mast.

7.2 Remove tape securing cables to tower and disconnect cables from sensors.

7.3 Carefully remove each sensor, disassemble as necessary and place in protective box.

7.4 Remove micrologger from metal box on trailer and place in secure place.

7.5 Remove crossarm assembly from extension pole.

7.6 Lower tower the rest of the way down.

7.7 Remove safety pin at base of tower and with at least one other person

assisting, lower tower down from a vertical position to a horizontal position resting on the support bar.

7.8 After trailer is hooked-up to the vehicle, place mast support pin, triangle block, cement block, and wood tire blocks in the metal box on trailer and lock.